



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,271	12/23/2003	Helmar Van Santen	081468-0307331	4441
909	7590	06/22/2005	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP			NGUYEN, HUNG	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	

2851

DATE MAILED: 06/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/743,271	Applicant(s) VAN SANTEN ET AL.	
	Examiner Hung Henry V. Nguyen	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/7/05; 2/20/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figures 2-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "30" (see figure 4). Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims or the features must be cancelled from the claims.

Art Unit: 2851

Claim 1 recites "no seal is provided between the barrier member and the object". However, as clearly illustrated in figure 4 of the present application, the rim (50) can be regarded as "a seal" provided between the barrier member (10) and the object (W). Please clarify and explain the above issues.

Information Disclosure Statement

4. The U.S. applications cited in the IDS filed 1/7/2005 and in the IDS filed 2/20/2004 have been reviewed and considered, but have been crossed out in the form 1449. They will not be printed on the resulting patent because they were not published documents.

Claim Objections

5. Claim 25 is objected to because claim 25 recites the limitation "the barrier member" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Art Unit: 2851

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. As best the claimed subject matters are understood. Claims are anticipated under the following prior art rejections.

Claims 21-23, 26-27, 30-31, 33-34 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Lin (U.S.Pat. 6,788,477).

With respect to claims 21 and 30, Lin discloses an immersion lithographic apparatus comprising all basic features of the instant claims such as a liquid supply system configured to provide an immersion liquid (22) to a space (50) between the substrate (20) the projection system (36), the liquid supply system comprising at least one immersion liquid inlet port provided on a boundary of the space and “wherein the immersion liquid is not substantially confined in the space so that immersion liquid can flow out of the space” (see figures 1B, 2, 4). It is noted that though Lin does not expressly show an illumination system, a support structure for supporting a patterning device but these elements are inherent teachings of the immersion lithographic apparatus and they must be presented for the immersion lithographic apparatus to function as intended.

Art Unit: 2851

As to claims 22-23, and 31, Lin discloses at least one immersion liquid outlet port (32) being radically outwardly of the at least one immersion liquid inlet port and positioned on the substrate table (12).

As to claims 26, and 33, Lin discloses the at least one immersion liquid inlet port being mechanically isolated from the projection system (see figures 1B, 2, 4).

As to claims 27, 30, and 34, Lin discloses at least one immersion liquid inlet port (for example, 30) being connected to at least one of a base frame that supports the substrata table.

8. Claims 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Tabarelli et al (U.S.Pat. 4,509,852).

With respect to claims 21-22, Tabarelli et al discloses a photolithographic projection apparatus comprising all of the limitations of the instant claims such as a liquid supply system configured to provide an immersion liquid (6) to a space between the substrate (8) the projection system (3), the liquid supply system comprising at least one immersion liquid inlet port (4) provided on a boundary of the space and “wherein the immersion liquid is not substantially confined in the space so that immersion liquid can flow out of the space” via the output port (5). Even though Tabarelli et al does not expressly show an illumination system, a support structure for supporting a patterning device but these elements are inherent teachings of the immersion lithographic apparatus and they must be presented for the immersion lithographic apparatus to function as intended.

9. Claims 1, 13, 21 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Takanashi et al (U.S.Pat. 4,480,910).

With respect to claims 1, 13, 21, 30, Takanashi et al discloses a lithographic apparatus comprising all structures as set forth in the instant claims such as: an illumination system (6) configured to provide a beam of radiation; a support structure for supporting a patterning device (5); a substrate table for supporting a substrate (1); a projection system (4) for projecting the patterns formed on the patterning device onto the substrate and a liquid supply system configured to provide an immersion liquid (3) to a space between the substrate and the projection system, the liquid supply system having a barrier (9) “extending along at least a part of the boundary of the space and being in a position relative to an object on the substrate table so that any capillary pressure generated by the immersion liquid between the barrier member and the object is not large enough to constrain the immersion liquid in the space, wherein no seal is provided between the barrier member and the object” and the liquid system having at least one immersion liquid inlet port (13) provided on the boundary of the space (see figure 3).

10. Claims 1-3, 8, 11-15, 19-23, 26-27 and 30-31, 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Ushida et al (JP 10303 114 A).

With respect to claims 1, 8, 11-13, 21, 26-27, 30, and 34, Ushida et al discloses an immersion lithographic apparatus and corresponding method comprising all of the limitations of the instant claims including: an illumination system configured to provide a beam of radiation (10); a support structure (16) for supporting a patterning device (R); a substrate table (WH) for supporting a substrate (W); a projection optical system for transferring the predetermined pattern formed on the patterning device onto the substrate; a liquid supply system (see figure 5) configured to provide an immersion liquid (LQ) to a space between the substrate and the

Art Unit: 2851

projection system, the liquid supply system comprising a barrier member (80) extending along at least a part of the boundary of the space and being a position relative to an object on the substrate table so that any capillary pressure generated by the immersion liquid between the barrier member and the object is not large enough to constrain the immersion liquid to the space, and wherein no seal is provided between the barrier member and the object.

As to claims 2-3, 14-15, 22-23, and 31, Ushida discloses at least one outlet (53A) being radically outward of the barrier member/located on the substrate table for removing immersion liquid.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 4, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ushida et al (U.S.Pat. JP-1003114A) in view of Fukami et al (WO99/49504).

With respect to claims 4 and 24, Ushida et al discloses substantially all of the structures set forth in the instant claims except for at least one outlet being suspended above the substrate table. Fukami et al (figure 1) discloses a lithographic system comprising a liquid supply system having at least one outlet (23) suspended above the substrate. In view of such teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to suspend at least one outlet of Ushida's liquid supply system above the substrate table, as

Art Unit: 2851

suggested by Fukami et al for the purpose of removing the liquid from the space between the substrate and the projection lens and avoid spillage.

13. Claims 5-6, 9-10, 16-18, 25, 28-29, 32-33, 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ushida et al (JP 10303114 A) in view of Schuster et al (U.S.Pat. 6,781,668).

With respect to claims 5-6, 9-10, 16-18, 24-25, 28-29, 32-33, 35-36, Ushida et al discloses a lithographic apparatus comprising substantially all of the limitations of the instant claims as discussed. Ushida et al does not expressly disclose an actuator configured to adjust at least of the height and tilt of the barrier member relative to the object. Schuster et al teach an actuator configured to adjust at least the height and tilt of barrier member (9) relative to the object (see col.6, lines 11-17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of the Ushida et al and Schuster et al to obtain the invention as specified in the above claims of the present invention. It would have been obvious to a skilled artisan to utilize the actuator as taught by Schuster et al into the lithographic apparatus/method of Ushida et al for the purpose of efficiently supplying the immersion liquid to the space between the projection system and the substrate.

As to claims 5-6, 16, 25, 32, Ushida as modified by Schuster lacks to show the distance between the substrate and the barrier member being in the specific range as recited in the claims. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the distance between the barrier member and the substrate as recited since it has been held that where the general conditions of a claim are disclosed in the

Art Unit: 2851

prior art, discovering the optimum or workable ranges involves only routine skill in the art . *In re Aller*, 105 USPQ 233.

Prior Art Made of Record

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nogawa et al (U.S.Pat. 6,665,046); Suwa (U.S.Pat. 5,825,043); Sewell (U.S.Pat. 6,809,794) discloses lithographic apparatuses which of which comprises substantially all of the elements as recited in the instant claims of the present invention.


15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Henry V. Nguyen whose telephone number is 571-272-2124. The examiner can normally be reached on Monday-Friday (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

hvn

5/16/05


HENRY HUNG NGUYEN
PRIMARY EXAMINER